

INTERNATIONAL TRADE AND CAPITAL MOVEMENTS

—A RE-EXAMINATION—

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In several recent publications the relationship between international trade and international capital movements has become subject of theoretical considerations. Many of these papers are in large parts based on the work of R.A. Mundell, who in the framework of a traditional Heckscher-Ohlin-Samuelson (HOS) model has demonstrated that under the assumptions of this model international capital movements will be a complete substitute for trade. In his geometric exposition Mundell proves that after the imposition of a (prohibitive) tariff a rise in national interest rates will induce a capital inflow and thus a change in production structure. After repatriation of interest payments to foreign capital owners this country will face the same consumption possibilities as in free trade equilibrium without an international exchange of products. The tariff—so Mundell argues—is “no longer necessary”¹ then to keep foreign capital from moving back. Mundell’s formulation shows that apparently the initial aim of the imposition of the tariff has been the inducement of capital inflows. Moreover, the absence of international trade relations in the new equilibrium situation may lead to the conclusion that the tariff has lost its influence on the national exchange ratio. Mundell’s findings that the tariff has fulfilled its task as a catalyst of capital inflows and that product trade does no longer take place, do—of course—not justify the conclusion that after the end of the “desired” international reallocation of capital and after reaching Mundell’s new equilibrium the tariff will be repealed by the political authorities automatically.

In his interesting analysis of the relationships between international trade and foreign investment Kojima² seems to fear that after reaching Mundell’s equilibrium of international capital movements the (formal) retention of the import tariff might lead to distortions and an inefficiency of the international allocation of resources. Closer consideration of the adjustment process following the imposition of the tariff reveals, however, that this apprehension is spurious, because after the international equalization of interest rates the tariff will not only be rendered unnecessary, but also loses its effect even if it is not repealed—a tariff, which loses its effect after an inflow of foreign capital, can hardly be the cause of any distortions in the efficiency of world production.

To demonstrate this and to illuminate some of the neglected implications of Mundell’s analysis it may be useful to sketch Mundell’s thoughts in their simplest form.

For this purpose the home country shall be assumed to be in free trade equilibrium with incomplete specialization and with cotton exported in exchange for steel. For simplicity the terms of trade may be taken as constant which even seems to be not too un-

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¹ R.A. Mundell, “International Trade and Factor Mobility,” *American Economic Review*, 1957.

² Kojima, K., “International Trade Foreign Investment,” *Hitotsubashi Journal of Economics*, 1975.

realistic for many countries. The geometric treatment of this initial situation is given by production point P and consumption point S in Figure 1. If all assumptions of traditional HOS-models are fulfilled there will also be international equality of factor prices.

Now suppose that this country imposes a tariff on its steel imports, and for reasons of exposition let this tariff be prohibitive. Both P and S will thereafter move to some point of self-sufficiency like Q . As Stolper and Samuelson³ have demonstrated there will be a rise in the rate of interest as a consequence of the expansion of the capital-intensive steel production, because restructuring from P to Q involves an increase in the scarcity of capital. In our world of international mobility of capital the emerging international differential of interest rates will induce a capital inflow to the home country, which in our graphical exposition results in a shift of the production possibility curve to the right. Mundell has shown that as a result of these capital inflows there may arise a situation where the capital-importing country can reach the initial free trade consumption point S without an international exchange of goods.⁴ Under the influence of the international exchange ratio production point P' will be reached on the "new" transformation curve, which after deduction of interest payments to foreign capital owners (P'/S) leaves to the home country the free trade consumption possibilities represented by S .

It is easily seen that P'/S represents the interest payments to foreign capital owners, since YY' (P'/S) shows the increase in total production, measured in terms of steel (cotton) units, while constancy of factor prices has left home incomes constant. The tariff has thus been circumvented and international capital movements have functioned as a substitute for trade. Mundell's elegant exposition will be convincing if the described initial and final situations S and P' are taken as given and are compared to each other. The adjustment process from the initial point of self-sufficiency Q up to the final equilibrium P' remains unexplained, however, and the question arises if autonomous market forces will be able to initiate the movement to production point P' , which Mundell seems to suppose.

Mundell's insufficient explanation of this shift from Q to P' may be one of the reasons of Kojima's apprehension and of the alleged superiority of free trade.⁵ Therefore a more detailed investigation seems to be useful.

A description of the adjustments in question is subject to a number of difficulties because after the imposition of an import tariff the divergence between the national and the international exchange ratio on one hand induces capital inflows while on the other hand these capital inflows will cause changes of production and consumption, which will in turn influence the exchange ratio. A description of simultaneous and interdependent adjustments in the framework of comparative statics is made possible, however, if the adjustment process is divided in a series of discrete steps, which will be carried out simultaneously in economic reality, but which may be considered one after the other for analytical purposes. Our "extended" consideration of the adjustments in question will have to start with the effects of a change in the national exchange ratio on factor prices and on capital inflows. Thereafter changes of production and consumption with their repercussions on the national exchange ratio must be analyzed. Adjustments of the exchange ratio will again exert their influence on factor prices and capital inflows, etc. If each adjustment step is

³ Stolper, W.F., and Samuelson, P.A., "Protection and Real Wages," *Review of Economic Studies*, 1941.

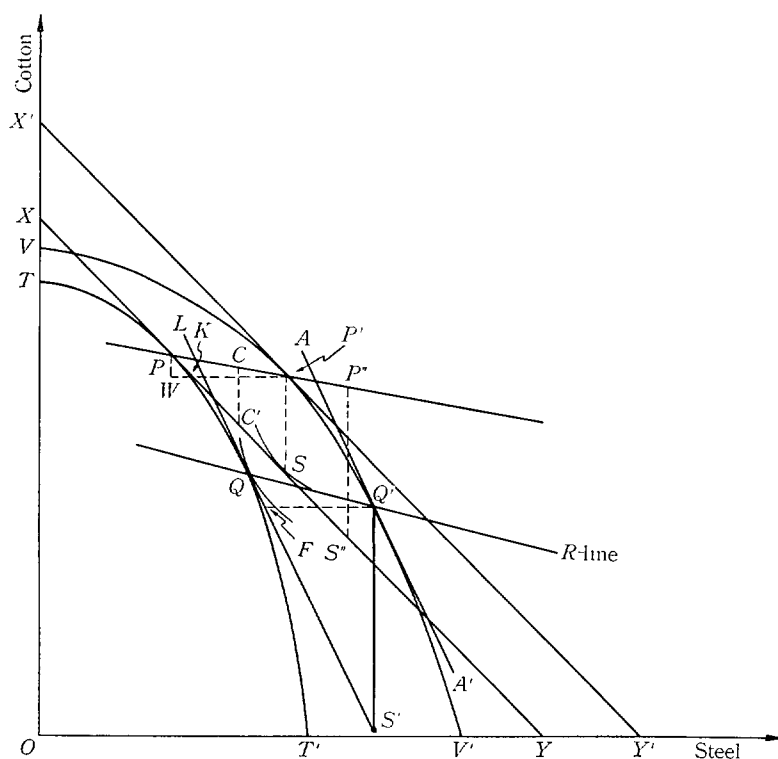
⁴ Mundell, R.A., *op. cit.*

⁵ Kojima, K., *op. cit.*, p. 4.

assumed to be extremely small in size, this procedure proves to be a useful instrument for the description of the interdependencies of exchange ratio, factor prices and capital movements.

If this method of exploration is applied to the situation described by Mundell, we find that after the imposition of a tariff on steel imports the national exchange ratio LS' and production point Q will emerge. As a consequence of the expanding steel production and the corresponding rise in interest rates capital inflows will shift the transformation curve to the right. At the existing price ratio $LS' (=AA')$ the production point will—as Rybczynski⁶ has shown—move along the R -line. If the existing margin between national and international interest rates induces a shift of the transformation curve to VV' within a certain space of time, for example, the production point moves to Q' . Interest payments to foreign capital owners will have to be deducted from this bundle of goods. For the present we assume that in the framework of our barter model cotton is used for this repatriation of dividends. Then $Q'S'$ shows the amount of cotton being transferred to foreign capital owners. S' shows the bundle of products, which can be consumed in the home country now, and comparison with the desired consumption point Q shows that at the existing national exchange ratio (LS') the point S' represents an excess supply of steel and a lack of

FIG. 1



⁶ Rybczynski, T.M., "Factor Endowment and Relative Commodity Prices," *Economica*, 1955.

cotton. Under the pressure of the described disequilibrium and the lower international exchange ratio $PS (=X'P')$ the real national price of steel will fall down to the international price. The production point on VV' will move to P' . If—as is shown in Figure 1— P' is found vertically above S , Mundell's analysis is confirmed: After deduction of repatriated capital incomes the home country is left with free trade consumption point S without having to import (export) steel (cotton). The home interest rate has readjusted to the international price of capital after the international equalization of exchange ratios, and future interest payments to the owners of the imported capital will therefore fall to $P'S$. Neither inflows nor drains of capital will occur in this situation. Even if the new production equilibrium is situated to the right and below P' (P'' , e.g.), S can be retained after transferring $P''S'' (=P'S)$ units of cotton to foreign capital owners, as an exchange of steel for cotton may result in a movement along the barter line $S''P$ to S . So far our main purpose has been the description of our analytical technique. The more interesting and more typical explanation of the occurrence of Mundell's equilibrium is found, when after a smaller initial capital inflow some production point to the left and above P' like C develops. Here the product bundle C' remains to the capital-importing country after the repatriation of dividends ($CC' = P'S$), and confrontation with the optimal consumption point S shows an excess supply of cotton and a lack of steel. The attempt to exchange cotton for steel will bring about steel imports, which are subject to the tariff, and the real national price of steel will rise again.

Together with the price of steel interest rates will rise and will initiate additional capital inflows and a further shift of the transformation curve. In the course of this shift C will approach P' , and it becomes clear that after a sufficiently large number of (extremely small) adjustments Mundell's equilibrium P' will in fact arise. The described movement from C to P' may be considered to be more relevant for our analysis than the previous movement from P'' to P' , since in this manner the expected continuous inflow of foreign capital is represented more realistically, and since structural adjustments and repercussions may eventually already start after a small capital inflow. Nevertheless consideration of P'' and C makes clear that movements from an initial equilibrium point to P' will not basically depend on the intensity of immediate capital inflows.

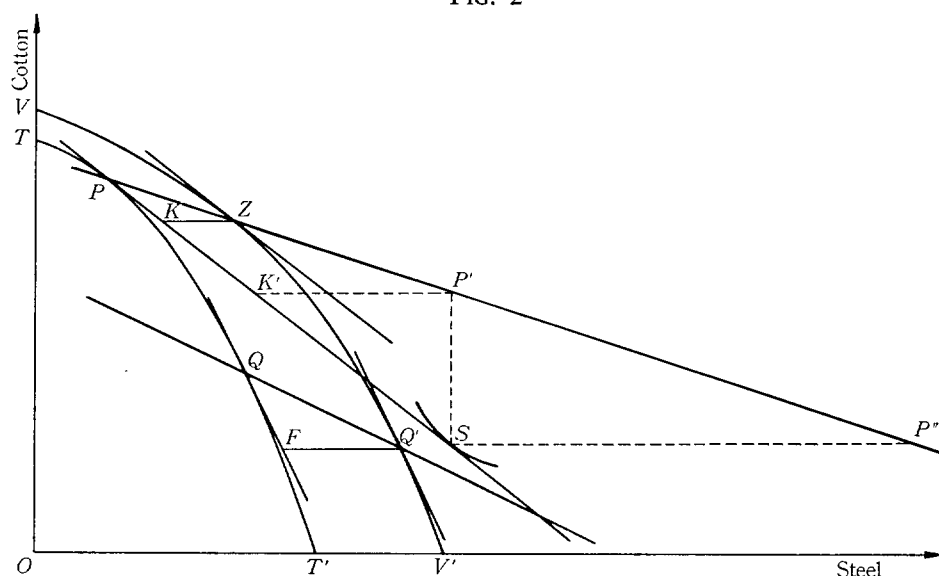
Up to this point our considerations have essentially retained Mundell's assumptions. So e.g. we assumed that interest payments to the owners of foreign capital carried out in terms of cotton. This corresponds to our assumption that the home country's trading partners want to import cotton at the given international exchange ratio. It must be kept in mind however, that the imported (and some part of the home) capital has obviously been used for the expansion of steel production. Therefore in our barter model capital owners will be paid with the marginal product of capital in the first instance, which means that foreign capital owners will receive a certain quantity of steel! This is shown by FQ' in Figure 1. After repatriation these capital incomes may then be exchanged for cotton at the world market exchange ratio.

It would be rewarding for foreign capital owners, of course, to exchange their capital incomes FQ' into cotton at the more favourable national exchange ratio QF . For this purpose they might offer $Q'F$ steel units in exchange for $Q'S'$ of cotton. This would represent an excess supply of steel and a corresponding excess demand for cotton with all its described repercussions on the national exchange ratio and the structure of production.

So we find that Mundell's equilibrium points P' and S would again arise.

A different result is found if interest transfers are carried out in terms of steel and are exchanged for cotton in the world market. This is easily shown if we start from free trade equilibrium S in Figure 2 and consider the adjustments after the imposition of a

FIG. 2



(prohibitive) tariff. In the first instance the imposition of the tariff will lead to the well-known self-sufficiency equilibrium Q and will induce a certain capital inflow, which will shift the production possibility line from TT' to VV' . The point of self-sufficiency will move along a Rybczynski-line to Q' , and in this "temporary" situation the product bundle F remains to the home country after deduction of foreign capital earnings.⁷ We find that F represents an excess supply of steel. The attempt to exchange cotton for steel will (under the influence of the world market exchange ratio) result in a decline of the home (real) price of steel and a simultaneous movement along VV' to Z . Now the remaining bundle K implies an excess demand for steel, and home individuals will therefore try to import steel. The tariff on imports will then no longer prove ineffective and additional capital inflows will follow.

If after a sufficient number of adjustment steps of the described kind production point Z has moved to P' , the production point described by Mundell is reached again. It is easily seen that under the assumptions of our model no final equilibrium is reached at Mundell's equilibrium point P' if we continue to assume that foreign capital incomes are repatriated in terms of steel: If interest payments to foreign capital owners are deducted, the home country is left with K' and thus with a renewed demand for imported steel, which makes the tariff effective again. A rise of national interest rates and further capital inflows will

⁷ The term "foreign capital earnings" will be used in the sense of "earnings of foreign capital owners in the home country."

follow until Z has moved to P'' . Here after the deduction of repatriated capital incomes ($P''S$) we finally obtain S , which is the initial free trade consumption point. Trade relations are no longer necessary—as Mundell has shown⁸—to make this bundle of goods accessible to the home country, but comparison with Figure 1 shows that a greater capital inflow than the one assumed by Mundell was necessary to bring about this equilibrium point.

Our assumption of repatriating interest payments in terms of the former importable “steel” seems to be in good accordance with observed facts: More and more we find that foreign investors in developing countries are producing goods for the delivery to the capital-exporting countries. Of course these deliveries are registered as exports in national statistics of the capital-receiving country, but it should not be forgotten that large parts of these export revenues are not under the disposal of the host country. In so far our model seems to be quite realistic.

As a result of our analysis we find that Mundell's description of an equilibrium, in which the efficiency of world production is sustained by international capital movements instead of international trade permits more than only one equilibrium solution. Between the two extreme cases of transferring capital incomes exclusively either in terms of steel or cotton there will be a large number of possible combinations of steel and cotton, and it will depend on the composition of these interest transfers how much foreign capital will be necessary to obtain a Mundellian equilibrium. Necessary capital inflows will have to be the larger the more the capital-intensive (and initially imported) good is withdrawn from the home country through repatriated capital earnings.

These results contradict the statement of Gehrels,⁹ who maintained that in a world with international mobility of capital and under the traditional HOS-assumptions the international distribution of capital will be indeterminate. It is a common characteristic of all Mundellian equilibria that the marginal rate of transformation, the national exchange ratio and the terms of trade are equalized: The description of the adjustment process following the imposition of an import tariff has shown that under the conditions of our model the final equilibrium will again and in spite of the tariff be subject to the influence of the international exchange ratio. Kojima's apprehension¹⁰ that capital movements will bring about some inefficiency of world production as long as the tariff is retained therefore is unnecessary. After reaching the new equilibrium the tariff on steel imports proves to be ineffective and will hardly be able to disturb the efficiency of the international allocation of resources. Moreover international capital movements have shown to be an instrument of overcoming the distorting effects of a tariff, and Kojima's presumption that capital movements in the presence of trade impediments might be of no worth, turns inside out.

⁸ Mundell, R.A., *op. cit.*

⁹ Gehrels, F., “Commodity Trade and Factor Mobility as Imperfect Substitutes,” *Weltwirtschaftliches Archiv*, 1976, p. 93.

¹⁰ Kojima, K., *op. cit.*, p. 4.